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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID R. MEKALA,
DAVID W. STEGINK,
MOSES M. DAVID, and
JOSEPH W. FRISK

Appeal 2009-009609
Application 10/666,626
Technology Center 1700

Before MICHAEL P. COLAIANNI, ADRIENE LEPIANE HANLON, and MARK NAGUMO, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the "MAIL DATE" (paper delivery mode) or the "NOTIFICATION DATE" (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1 through 12 and 30. Claims 13 through 29, the other claims pending in this application, stand withdrawn from consideration by the Examiner. We have jurisdiction pursuant to 35 U.S.C. § 6.

We AFFIRM.

STATEMENT OF THE CASE

The subject matter on appeal is directed to a fuel cell gas diffusion layer. Claim 1 is illustrative:

> 1. A fuel cell gas diffusion layer comprising a hydrophilic surface layer having a thickness of no more than 0.5 micron, and, thereunder, a hydrophobic second layer comprising a fluoropolymer having a thickness of at least 5 microns.

The Examiner maintains the following rejections:

1) Claims 1-4, 6, and 30 under 35 U.S.C. § 103(a) as unpatentable over Barton (WO 03/058743 A2; published Jul. 17, 2003);

2) Claims 5-7 under 35 U.S.C. § 103(a) as unpatentable over Barton;

3) Claims 8-10 under 35 U.S.C. § 103(a) as unpatentable over Barton and Nagamori (JP 11-45733 A; published Feb. 16, 1999);

4) Claim 11 under 35 U.S.C. § 103(a) as unpatentable over Barton and Segit (WO 02/22952 A2; Mar. 21, 2002); and

5) Claim 12 under 35 U.S.C. § 103(a) as unpatentable over Barton and Taniguchi (US 6,083,638, Jul. 4, 2000).

With respect to rejection (1), Appellants focus their arguments on features recited in claim 1. (Br. 5-6). Accordingly, we address Appellants' arguments with respect to claim 1 only. *See* 37 C.F.R. § 41.37(c)(1)(vii).

With respect to rejections (2) through (5), Appellants provide no additional argument for these rejections and instead refer to the arguments made regarding the rejection of claim 1 in rejection (1). (Br. 6). Therefore, the claims under rejections (2) through (5) stand or fall with our decision regarding the rejection of claim 1 in rejection (1).

REJECTION (1)

ISSUE

Did the Examiner reversibly err in determining that Barton would have rendered obvious the fuel cell gas diffusion layer having "a hydrophilic surface layer having a thickness of no more than 0.5 micron" as required by claim 1 within the meaning of § 103? We decide this issue in the negative.

FINDINGS OF FACT (FF)

1. The Examiner states that

   > The Barton reference discloses a gas diffusion backing comprising a porous carbon paper "1" impregnated with a first fluorinated polymer as a first layer and a microporous layer "5" of a second fluorinated polymer which contains carbon particles wherein the first fluorinated polymer is hydrophobic and the second fluorinated polymer is hydrophilic.

   (Ans. 3).

2. Barton teaches that, in one embodiment, "the first fluorinated polymer may be hydrophobic and second fluorinated polymer hydrophilic." (Barton, p. 7, ll. 18-19).

3. Barton teaches that "[t]he second layer (i.e., layer 5) in the composite gas diffusion backing so formed has a thickness of about 1 to about 100 microns, preferably between about 8 and about 15 microns." (Barton, p. 14, ll. 18-20).
4. Barton teaches that

> [i]n general, thinner coatings and larger pore sizes will promote mass transport across the coating. The formation of very large pores, however, tends to result in diminished contact between the carbon particles of the micro-porous layer and active regions of the catalyst, and thus reduces efficiency of a fuel cell for a given loading of carbon particles. Namely, there will be a need to employ routine experimentation to optimize the microporous layer 5 for a particular application.

(Barton, p 14, l. 32 to p. 15, l. 5).

Additional findings of fact are made as necessary in the Analysis that follows.

PRINCIPLE OF LAW

Typically, "[a] prima facie case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties." *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (emphasis omitted); *see also Titanium Metals v. Banner*, 778 F.2d 775, 783 (Fed. Cir. 1985).

To "teach away," a reference must state that it "should not" or "cannot" be used in combination with another reference. *Para-Ordnance Mfg., Inc. v. SGS Importers Int'l, Inc.*, 73 F.3d 1085, 1090 (Fed. Cir. 1995).

ANALYSIS AND CONCLUSION

Appellants argue that "[t]he Examiner provides no support for the assertion that Barton teaches that the thickness of the hydrophobic [sic, hydrophilic] layer is a results effective variable." (Br. 5). In addition, Appellants argue that "Barton *teaches away* from . . . [the] limitation ['a thickness of no more than 0.5 micron[s]' required by claim 1] since it recites a preferred thickness of 'between about 8 and 16 microns." (Br. 5).

Appellants also argue that

> Barton would not be expected to enable a fuel cell GDL [gas diffusion layer] having such a thin a [sic] hydrophilic surface layer. Barton . . . purports to exemplify the use of a rod coating . . . In contrast, one method of forming so thin a hydrophilic layer taught in the present Specification involves plasma treatment of the surface of a GDL.

(Br. 5) (emphasis omitted).

With respect to Appellants' argument at page 5 of the Brief that "[t]he Examiner provides no support for the assertion that Barton teaches that the thickness of the hydrophobic [sic, hydrophilic] layer is a results effective variable," Appellants' argument is unpersuasive because it fails to address the Examiner's stated case.

In this regard and contrary to Appellants' argument, the Examiner finds that Barton teaches that its second layer (corresponding to the claimed hydrophilic surface layer) may have a thickness of “about 1 to about 100 microns”. (Ans. 3; *see* FF 3). The Examiner also finds that that

> [t]he Barton reference expressly teaches that thinner coatings (hydrophilic surface layer) will promote mass transport across the coating (See page 14, lines 32-33). It also expressly teaches that there will be a need to employ routine experimentation to optimize the microporous layer 5 (hydrophilic surface layer) for a particular application (See page 15, lines 4-5).

(Ans. 7). Indeed, Barton teaches that

> [i]n general, thinner coatings and larger pore sizes will promote mass transport across the coating. The formation of very large pores, however, tends to result in diminished contact between the carbon particles of the micro-porous layer and active regions of the catalyst, and thus reduces efficiency of a fuel cell for a given loading of carbon particles. Namely, there will be a need to employ *routine experimentation* to *optimize* the microporous layer 5 [i.e., second layer] for a particular application.

(FF 4; *see also* FF 3) (emphasis added).

Based on Barton's teachings, the Examiner determines that one of ordinary skill would have arrived at a fuel cell gas diffusion layer having the claimed thickness of the second layer (corresponding to the claimed hydrophilic surface layer) since the "discovery of an optimum value of a result effective variable by routine experimentation in a known process is ordinarily within the skill of the art." (Ans. 3 and 4). Thus, since Appellants fail to address the Examiner's stated case, Appellants' argument is without persuasive merit.

With respect to Appellants' teaching away argument, while Barton at page 14, lines 19-20 teaches that "[t]he second layer [corresponding to the claimed hydrophilic surface layer] . . . in the composite gas diffusion backing . . . has a thickness . . . preferably between about 8 and about 16 microns," Appellants have not directed our attention to any credible evidence that indicates, for example, that Barton's second layer (corresponding to the claimed hydrophilic surface layer) cannot or should not have a thickness of no more than 0.5 microns as required by claim 1. *See Para-Ordnance*, 73 F.3d at 1090. Rather, Barton discloses a broader

range of suitable thicknesses ranging from "*about* 1 to about 100 microns" (emphasis added), which, based on the breadth of Barton's range of suitable thicknesses and the desire for thinner coatings, reasonably may include a thickness of about 0.5 micron.

Moreover, since the claimed hydrophilic surface layer's upper portion of the thickness range (i.e., "no more than 0.5 micron[s]") is very close to the lower portion of Barton's thickness range (i.e., "about 1 to about 100 microns"), absent evidence to the contrary, one of ordinary skill would have expected a film having a thickness of 0.5 microns to have substantially the same properties of a film having a thickness of about 1.0 microns. Given that reasonable expectation, it would have been obvious to one of ordinary skill to employ a thickness of Barton's second layer (corresponding to the claimed hydrophilic surface layer) to be within the claimed range. *See Peterson*, 315 F.3d at 1329; *see also Titanium*, 778 F.2d at 783.

Thus, contrary to Appellants' argument, Barton's mere teaching of a preferred range of about 8 to about 16 microns is not a "teaching away" from a second layer (corresponding to the claimed hydrophilic surface) having a thickness of no more than 0.5 microns as required by claim 1. Accordingly, Appellants' argument is unpersuasive of reversible error.

With respect to Appellants' argument at page 5 of the Brief that Barton would not have been expected to enable a fuel cell gas diffusion layer having such a thin hydrophilic surface layer because Barton exemplifies the use of a rod coating method, Appellants have not shown that the Examiner's reliance on Barton's rod coating step to form the claimed hydrophilic surface layer is faulty, because Appellants have not come forward with any credible evidence or persuasive argument that, for example, this rod coating step is

not capable of producing a hydrophilic surface layer having the claimed thickness.

Indeed, as correctly stated by the Examiner, "there is no evidence to show that the rod coating process taught by Barton is not capable of forming a layer that has a thickness of 0.5 micron[s]." (Ans. 8). Accordingly, Appellants' argument is unpersuasive of reversible error.

Accordingly, we sustain the Examiner's rejections (1) through (5).

ORDER

In summary, on the record before us, we sustain the Examiner's rejections (1) through (5).[2]

Accordingly, the Examiner's decision is affirmed.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(2009).

AFFIRMED

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[2] Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants could have made but chose not to make have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

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